

APPROVED FOR ENTRY

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GEROTOR MECHANISM FOR A SCREW HYDRAULIC MACHINE

Field of the Invention

The invention relates to gerotor mechanisms of the screw downhole motors used for drilling the oil and gas wells, to the screw pumps employed for extracting oil and for pumping fluids, and also relates to the general-purpose screw hydraulic motors.

Background of the Invention

Known is a multi-lead screw gerotor mechanism for a screw downhole motor, comprising: a stator having inner helical teeth made of a resilient-elastic material, e.g. of rubber; and a rotor having outer helical teeth, number of which outer teeth by one tooth is less than that of the stator teeth; the rotor axis being shifted with respect to the stator axis by the eccentricity value being half of the teeth's radial height; profiles of the rotor's outer teeth and stator's inner teeth are mutually-enveloping when viewed in the end-face section; and leads of the rotor and stator teeth being proportional to a number of their teeth (see patent RU 2165531, IPC F01C 1/16, 5/04, E21B4/02, 2000).

In the prior-art designs, profiles of the stator and rotor teeth, when viewed in the end-face section, are implemented as the envelopes of the common initial contour of the cycloidal rack defined by the curtailed cycloid equidistance. In this end-face section, thickness C_t of the stator tooth across the mean diameter D_m of the teeth and circular pitch S_t of these teeth are interrelated according to the following ratio: $C_t/S_t = 0.45 \quad 0.65$;

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